Draper Low Voltage, Remote Control, Serial and Network Wiring Guide

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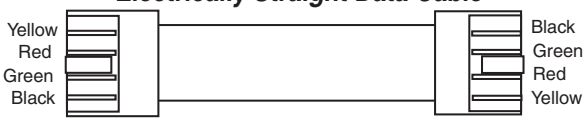
Please Note

① Make sure power is disconnected before installing controls.
② LVC-III and MC1 are line voltage controls, designed to operate one motor with activation by Low Voltage input commands.
③ The MC1 receiver has a built in fuse that provides protection from electrical shorts and overload.
④ Avoid static discharge, especially to screw terminals and eye jack.

Please Note:

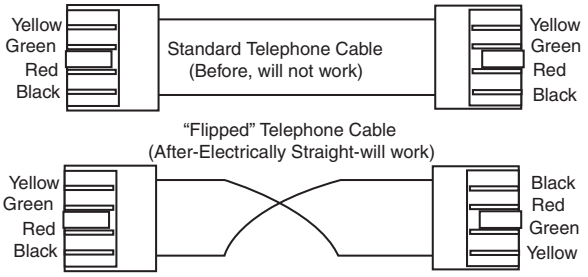
All input devices (low voltage LED switches, IR eye, RF receiver) which connect to the Eye jack must be connected using ***electrically straight*** 4-conductor modular cable (RJ11). This means colors do not cross over: blue leads to blue, orange to orange, etc. (see diagram below)

Electrically Straight Data Cable



Using Telephone Cable

If you use standard telephone cable, you must first remove one connector, turn it over and re-attach, to ensure that the cable is electrically straight (see diagram below).



All connection wires must conform to the motor manufacturer's recommendation and prevailing electrical codes. The switch and control system wires should be at least 24 AWG and no larger than 18 AWG.

Electrical Specifications—MC1

Input:

DATA: 5V AC (through "Eye" port)
Low Voltage/Serial: Dry Contact—0v AC

Output: **115V AC version:** Rated at 3.8 Amps, 1/8th HP, fuse should be 4 Amp 250V 5x20mm fast or slow blow.
230V AC version: Rated at 1.9 Amps, 1/8th HP, fuse should be 2 Amp 250V 5x20mm fast or slow blow.

Dimensions: $2\frac{1}{8}$" W x $3\frac{1}{4}$" L x $\frac{7}{8}$" H.

Electrical Specifications—LVC-III

Input:

DATA: 5V AC (through "Eye" port)
Low Voltage/Serial: Dry Contact—0v AC

Output: **115V AC version:** Rated at 6 Amps, 1/3 HP, fuse should be 6.3 Amp 250V 5x20mm fast or slow blow.
230V AC version: Rated at 3 Amps, 1/3 HP, fuse should be 3.15 Amp 250V 5x20mm fast or slow blow.

Note: Holds contact 180 seconds.

Electrical Connections

Screens, AeroLifts and Micro Projector Lifts operate on 110-120V, 60 Hz. AC current.

Screens, AeroLifts and Micro Projector Lifts are shipped with internal wiring complete and control switch(es) fully boxed. Wire to connect screen to switch(es) and switch(es) to power supply should be furnished by installer.

Connections should be made in accordance with approved wiring diagrams, and wiring should comply with national and local electrical codes.

All operating switches should be "off" before power is connected.

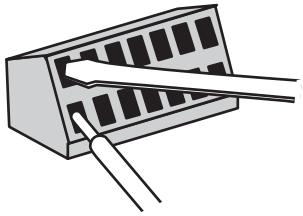
Notes on Cable Lengths:

You can have a total of approximately 100 feet of cable (this includes ALL cables connected to ALL Eye and Aux ports) per MC1 or LCV-III, up to a maximum of 1000 feet. However, the RF Receiver can drive up to 1000 feet of cable.

Spring-Loaded Terminals

When running wires to the spring-loaded terminals on the MC1 or LVC-III, use the following steps:

① Strip outer wire sheathing back 1", then strip insulation of individual wires back $\frac{3}{8}$".
② Place screwdriver into the top slot to open the spring-loaded terminal.
③ Slide wire into terminal connection point.
④ Remove screwdriver. Wire is now locked into place.



Notes on Power Consumption:

Any input device may be connected to any available Eye port. All Eye ports are "powered" by the MC1 or LVC-III they feed off of. Each MC1 Eye port provides 2 milliAmps to the connected input devices; the LVC-III Eye port provides 75 milliAmps at 5V of power. You may attach any combination of input devices to an MC1 or LVC-III Eye port, as long as the ***combined*** power requirements do not exceed the available power from the MC1 or LVC-III (see chart). ***RF receivers and LED switches require their own power supply when used with the MC1. Power supply can power up to three input devices.***

Input Device Power Consumption Chart

Input Device	Power Consumption (milliAmps)
RF Remote Receiver	33*
IR Receiver Eye	2
LED Wall Switch	24*
Dry Contact Switch	0

**** Requires additional, separate power supply.***

Please Note:

Wiring diagrams are available for each control and input device at www.draperinc.com.

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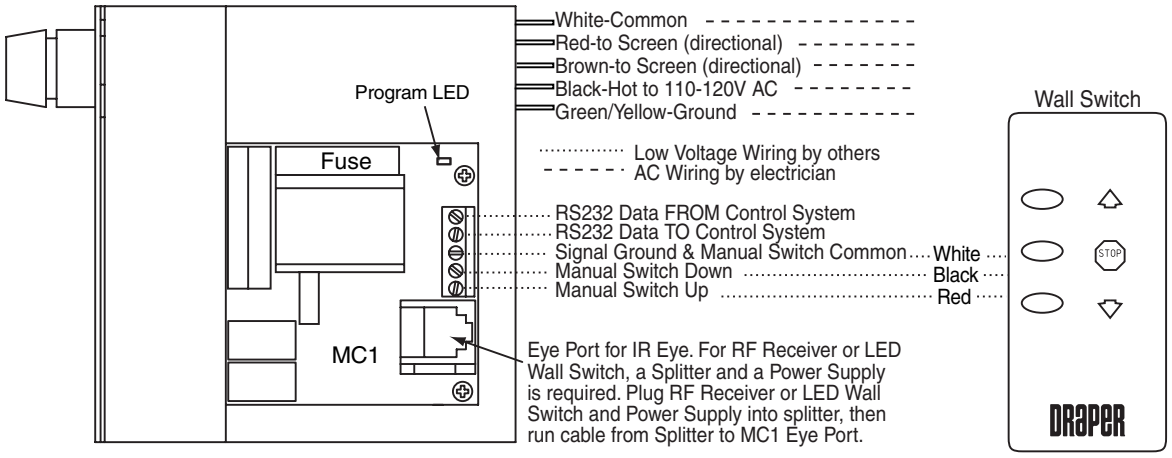
If you encounter any difficulties installing/wiring your MC1 or LVC-III, call your dealer or Draper, Inc., Spiceland, Ind., (765) 987-7999; fax (765) 987-7142; or e-mail draper@draperinc.com.

Wiring Diagram for Two-Way Serial Communication with RS232 and Low Voltage Dry Contact Wall Switch


White-Common
Red-to Screen (directional)
Brown-to Screen (directional)
Black-Hot to 110-120V AC
Green/Yellow-Ground
Program LED
Fuse
Low Voltage Wiring by others
AC Wiring by electrician
RS232 Data FROM Control System
RS232 Data TO Control System
Signal Ground & Manual Switch Common
Manual Switch Down
Manual Switch Up
White
Black
Red
MC1
Eye Port for IR Eye. For RF Receiver or LED Wall Switch, a Splitter and a Power Supply is required. Plug RF Receiver or LED Wall Switch and Power Supply into splitter, then run cable from Splitter to MC1 Eye Port.
Wall Switch
STOP
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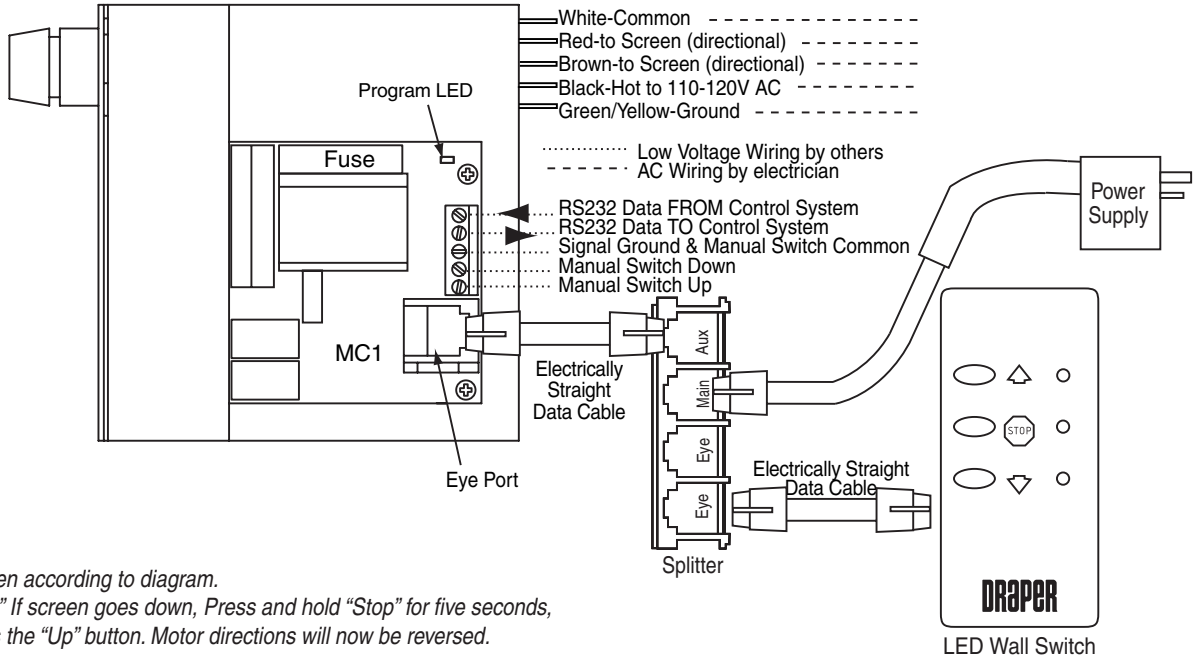
① *Wire Screen according to diagram.*
② *Press "Up." If screen goes down, switch black and red wires at the switch. Motor directions will now be reversed.*

Wire to connect power to MC1 should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The MC1 comes enclosed in a metal box conforming to the National Electric Code (NEC) with appropriate spacing between the wires and any exposed parts of the box. Wire to connect the switch to the dry contacts on the MC1 must be 3-conductor.

Wiring Diagram for Two-Way Serial Communication with RS232 and Low Voltage LED Wall Switch

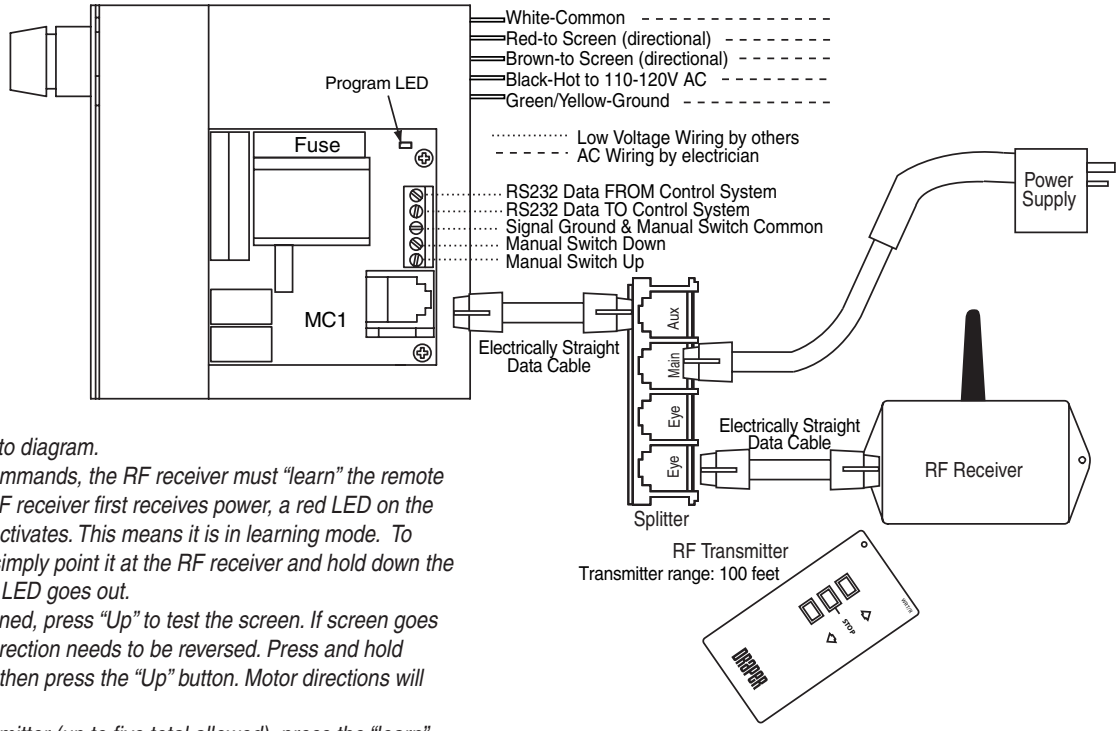


① *Wire Screen according to diagram.*
② *Press "Up." If screen goes down, Press and hold "Stop" for five seconds, then press the "Up" button. Motor directions will now be reversed.*

Wire to connect power to MC1 should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The MC1 comes enclosed in a metal box conforming to the National Electric Code (NEC) with appropriate spacing between the wires and any exposed parts of the box. LED switch connects to MC1 using modular data or telephone cord (RJ11), which must be isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). LED switch must be within 1,000 feet of the MC1, must have a power supply, and must run through a splitter before the MC1. Power supply can power up to three input devices. A dry contact wall switch may also be connected to the MC1 using 3-conductor wire.

When a button is pressed, the LED next to the button turns from green to red, and remains red until another button is pressed.

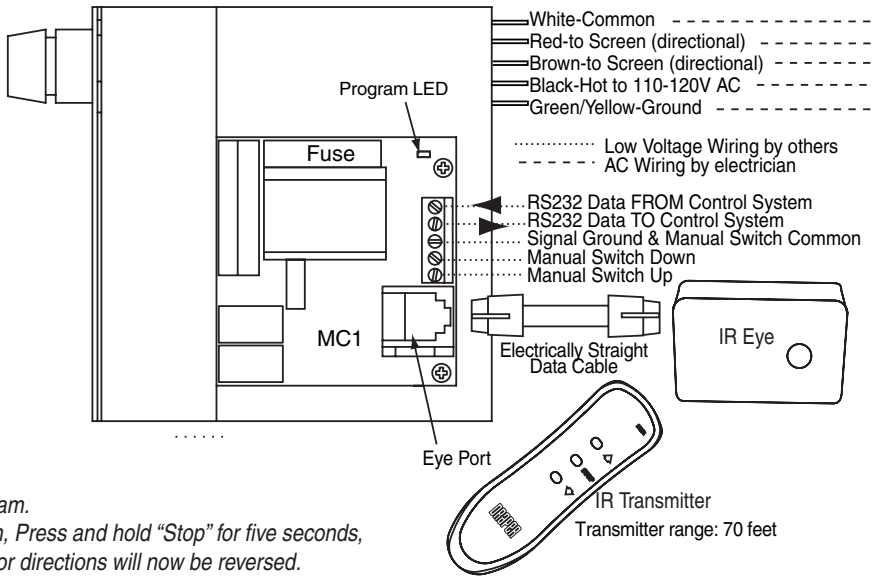
Wiring Diagram for Two-Way Serial Communication with RS232 and low voltage Radio Frequency Remote Control



① *Wire Screen according to diagram.*
② *Before you can send commands, the RF receiver must "learn" the remote transmitter. When the RF receiver first receives power, a red LED on the bottom of the receiver activates. This means it is in learning mode. To "learn" the transmitter, simply point it at the RF receiver and hold down the "up" button until the red LED goes out.*
③ *Once the remote is learned, press "Up" to test the screen. If screen goes down, then the motor direction needs to be reversed. Press and hold "Stop" for five seconds, then press the "Up" button. Motor directions will now be reversed.*
④ *To learn a second transmitter (up to five total allowed), press the "learn" button on the bottom of the receiver, and repeat step 2 (you will have 10 seconds after pressing the "learn" button).*

Wire to connect power to MC1 should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The MC1 comes enclosed in a metal box conforming to the National Electric Code (NEC) with appropriate spacing between the wires and any exposed parts of the box. RF receiver is connected to MC1 using low voltage modular data or telephone cord (RJ11), which is isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). The RF Receiver must be within 1,000 feet of the MC1, must have a power supply, and must run through a splitter before the MC1. Power supply can power up to three input devices. A dry contact wall switch may also be connected to the MC1 using 3-conductor wire.

Wiring Diagram for Two-Way Serial Communiation with RS232 and low voltage Infrared Remote Control

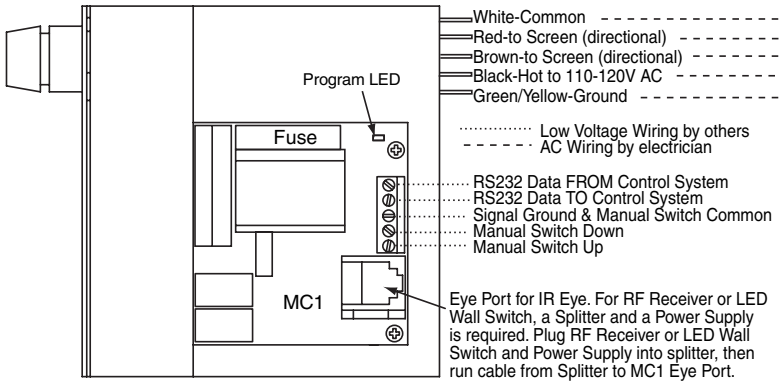


① *Wire Screen according to diagram.*
② *Press "Up." If screen goes down, Press and hold "Stop" for five seconds, then press the "Up" button. Motor directions will now be reversed.*

Wire to connect power to MC1 should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The MC1 comes enclosed in a metal box conforming to the National Electric Code (NEC) with appropriate spacing between the wires and any exposed parts of the box. IR Eye is connected to MC1 using low voltage modular data or telephone cord (RJ11), which is isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). The IR eye must be within 100 feet of the MC1. A dry contact wall switch may also be connected to the MC1 using 3-conductor wire.

Wiring Diagram for Two-Way Serial Communication with RS232

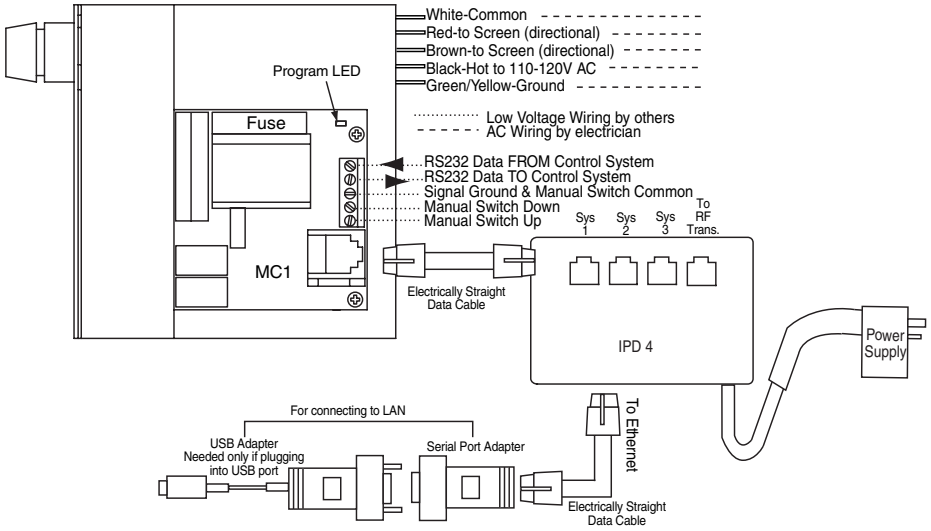
See separate Serial Communication-RS232 Instruction sheet for enabling RS232 with the MC1.


White-Common
Red-to Screen (directional)
Brown-to Screen (directional)
Black-Hot to 110-120V AC
Green/Yellow-Ground
Program LED
Fuse
Low Voltage Wiring by others
AC Wiring by electrician
RS232 Data FROM Control System
RS232 Data TO Control System
Signal Ground & Manual Switch Common
Manual Switch Down
Manual Switch Up
MC1
Eye Port for IR Eye. For RF Receiver or LED Wall Switch, a Splitter and a Power Supply is required. Plug RF Receiver or LED Wall Switch and Power Supply into splitter, then run cable from Splitter to MC1 Eye Port.

Wire to connect power to MC1 should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The MC1 comes enclosed in a metal box conforming to the National Electric Code (NEC) with appropriate spacing between the wires and any exposed parts of the box. Wire to connect system integration products or other controls using RS232 (two-way serial communication) to MC1 must be 3 conductors with ground. A dry contact wall switch may also be connected to the MC1 using 3-conductor wire.

Wiring Diagram for One-Way Network Communication via Ethernet with IPD4

For additional motors, plug additional MC1s into "Sys 2" and "Sys 3" jacks. Jack is also provided in IPD4 for RF Transmitter.



Wire to connect power to MC1 should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The MC1 comes enclosed in a metal box conforming to the National Electric Code (NEC) with appropriate spacing between the wires and any exposed parts of the box. IPD 4 for control via Ethernet (network communication) is connected to MC1 using low voltage modular data or telephone cord (RJ11), which is isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). IPD4 must be within 1,000 feet of MC1. A dry contact wall switch may also be connected to the MC1 using 3-conductor wire. An RF transmitter can also be connected to the IPD4 to allow commands to be transmitted to a radio receiver connected to the MC1.

Protocol and Address

The IPD4 shall be pre-configured with an IP address of 192.168.42.4 and port 4001. To communicate with the IPD4, establish a connection to its address and port, and then transmit data packets containing instructions. The protocol for the IPD4 are not as complete as that for the RS232 protocol used by the MC1, but they are compatible. Please consult the RS232 Protocol Guide for details of the instructions.

Follow the standard pin configuration for MC1 wiring (black always on the left, straight through). The ENET port on the IPD4 allows for the network connection to be established. The RJ45 connection (T568A) can be configured as a standard straight through connection (see Fig. 1 below) when connected to network hub. A cross-over connection (T568B, see Fig. 2 below) is used when connecting directly to a PC without a network connection. A data quality CAT5 cable must be used for the ENET port on the IPD4 and connect to the network.

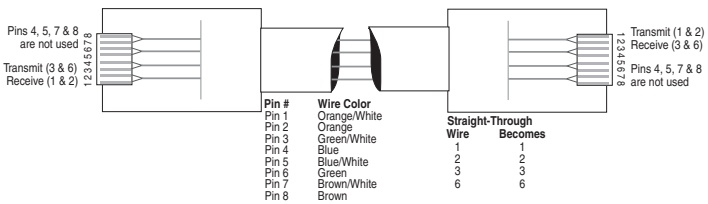


Figure 1

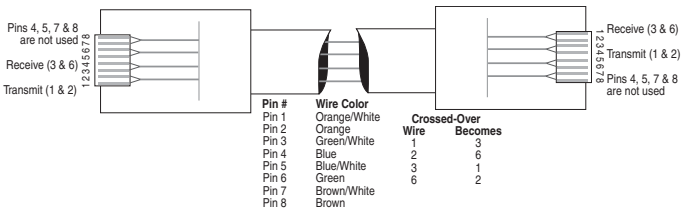
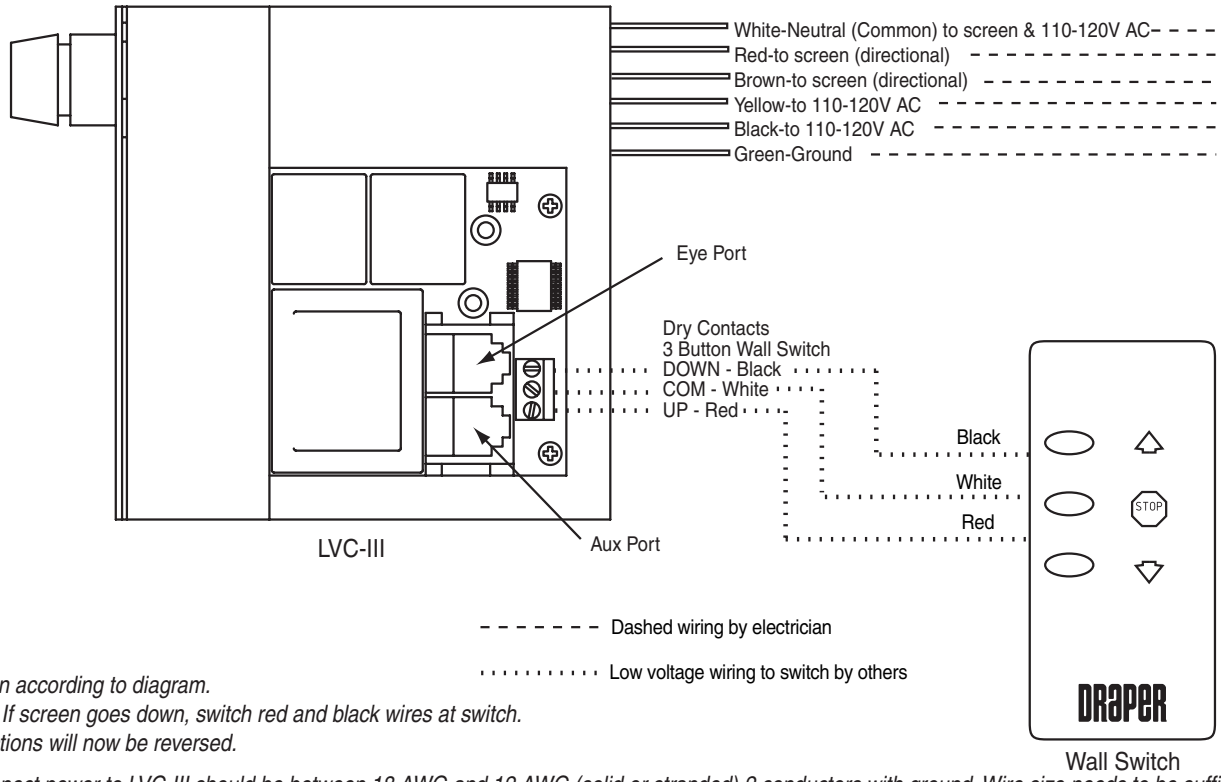


Figure 2

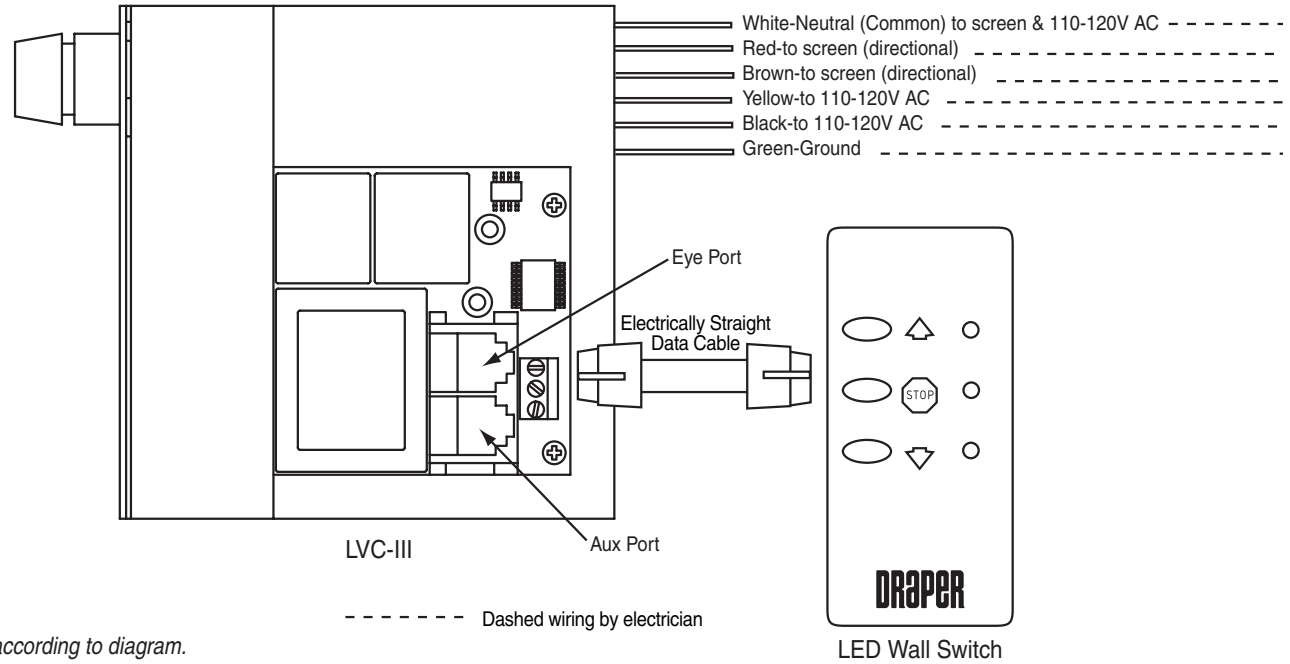
Wiring Diagram for LVC-III with Low Voltage Dry Contact Wall Switch



① *Wire Screen according to diagram.*
② *Press "Up." If screen goes down, switch red and black wires at switch. Motor directions will now be reversed.*

Wire to connect power to LVC-III should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The LVC-III comes enclosed in a metal box conforming to the National Electric Code (NEC). Wire to connect the switch to the dry contacts on the LVC-III must be 3-conductor.

Wiring Diagram for LVC-III with Low Voltage LED Wall Switch

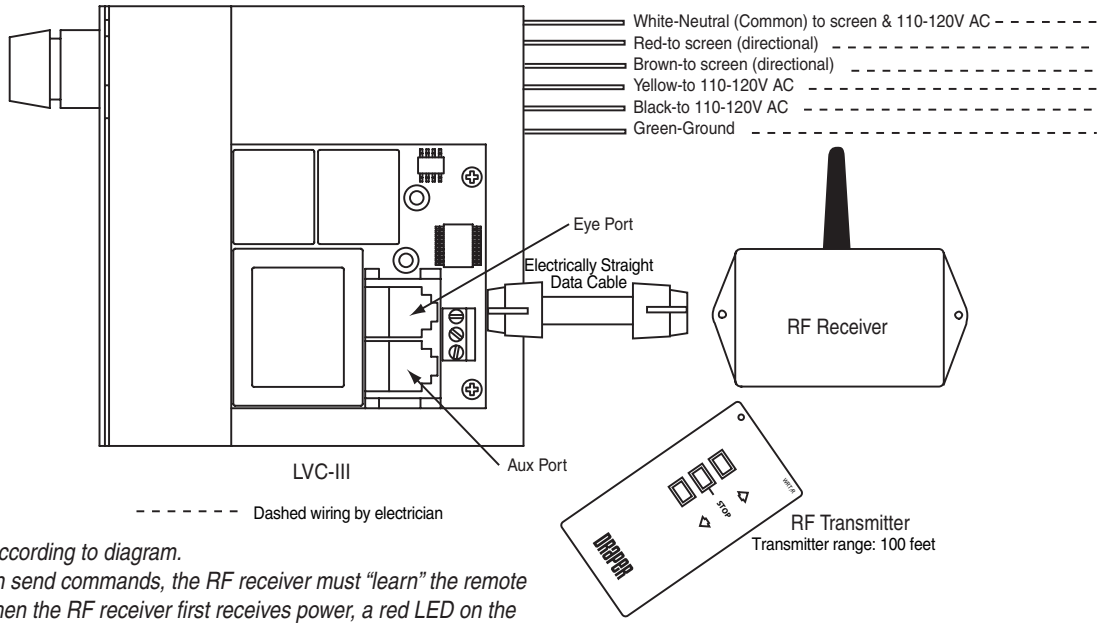


① *Wire Screen according to diagram.*
② *Press "Up." If screen goes down, up and down wires from motor should be switched. Motor directions will now be reversed.*

Wire to connect power to LVC-III should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The LVC-III comes enclosed in a metal box conforming to the National Electric Code (NEC). LED switch connects to LVC-III using modular data or telephone cord (RJ11), which must be isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). LED switch must be within 1,000 feet of the LVC-III. A dry contact wall switch may also be connected to the LVC-III using 3-conductor wire.

When a button is pressed, the LED next to the button turns from green to red, and remains red until another button is pressed.

Wiring Diagram for LVC-III with Low Voltage Radio Frequency Remote Control



① *Wire Screen according to diagram.*

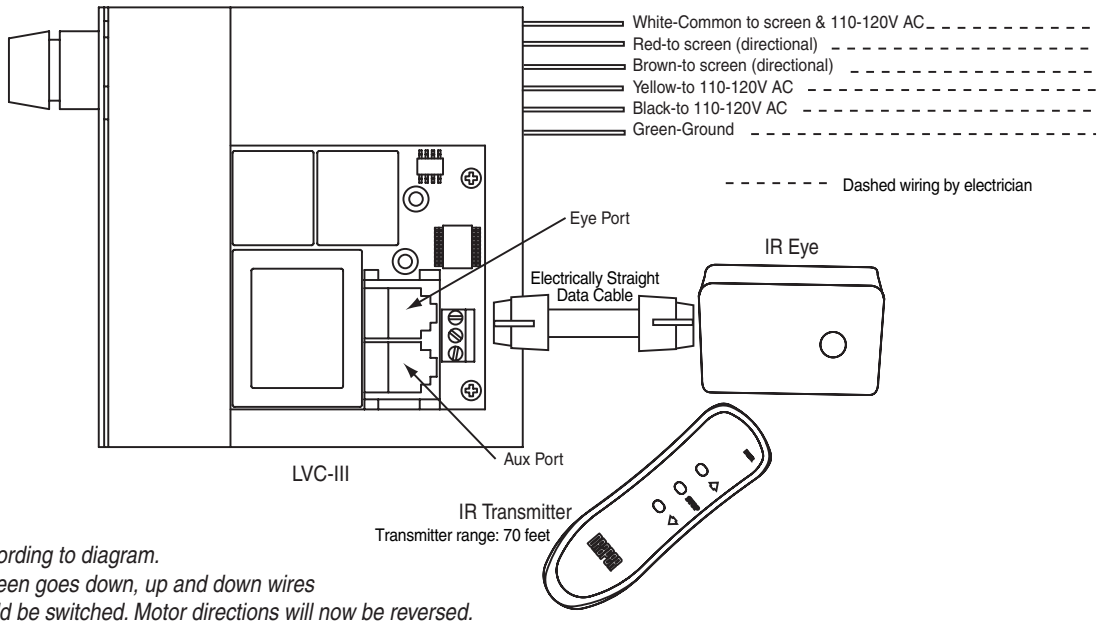
② *Before you can send commands, the RF receiver must "learn" the remote transmitter. When the RF receiver first receives power, a red LED on the bottom of the receiver activates. This means it is in learning mode. To "learn" the transmitter, simply point it at the RF receiver and hold down the "up" button until the red LED goes out.*

③ *Once the remote is learned, press "Up" to test the screen. If screen goes down, up and down wires from motor should be switched. Motor directions will now be reversed.*

④ *To learn a second transmitter (up to five total allowed), press the "learn" button on the bottom of the receiver, and repeat step 2 (you will have 10 seconds after pressing the "learn" button).*

Wire to connect power to LVC-III should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The LVC-III comes enclosed in a metal box conforming to the National Electric Code (NEC). RF receiver is connected to LVC-III using low voltage modular data or telephone cord (RJ11), which is isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). The RF receiver must be within 1,000 feet of the LVC-III. A dry contact wall switch may also be connected to the MC1 using 3-conductor wire.

Wiring Diagram for LVC-III with Low Voltage Infrared Remote Control

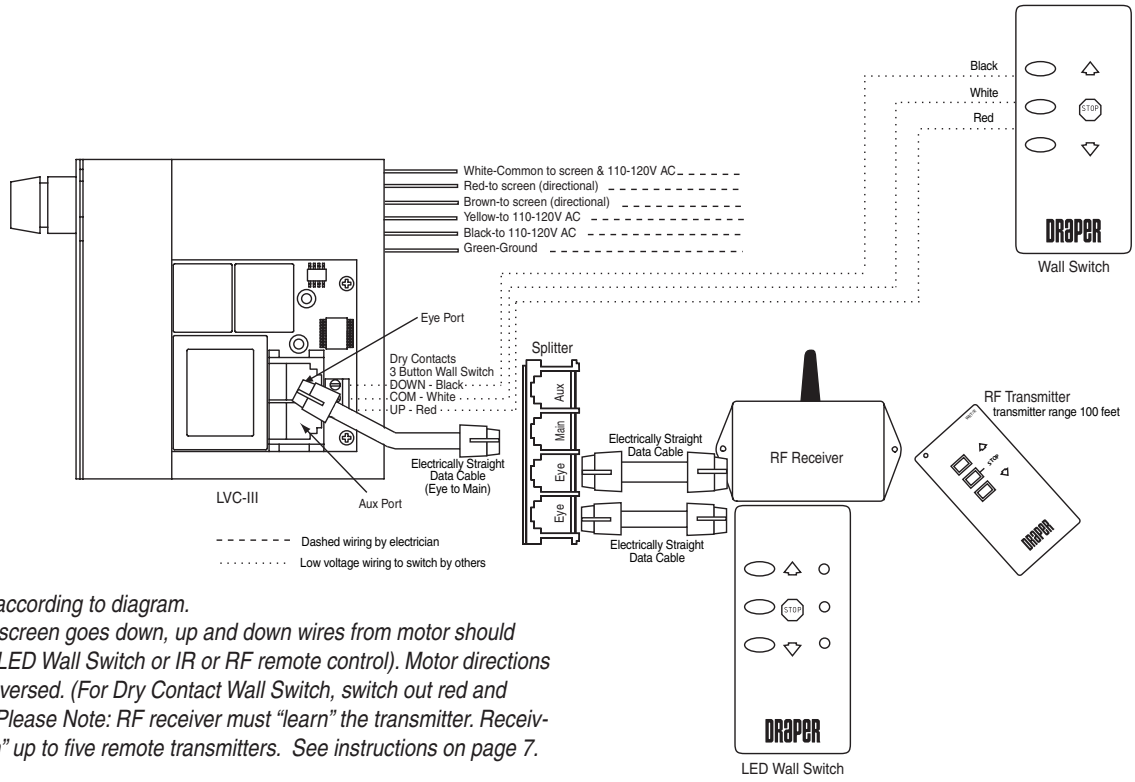


① *Wire Screen according to diagram.*

② *Press "Up." If screen goes down, up and down wires from motor should be switched. Motor directions will now be reversed.*

Wire to connect power to LVC-III should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The LVC-III comes enclosed in a metal box conforming to the National Electric Code (NEC). IR Eye is connected to LVC-III using low voltage modular data or telephone cord (RJ11), which is isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). The IR eye must be within 100 feet of the LVC-III. A dry contact wall switch may also be connected to the LVC-III using 3-conductor wire.

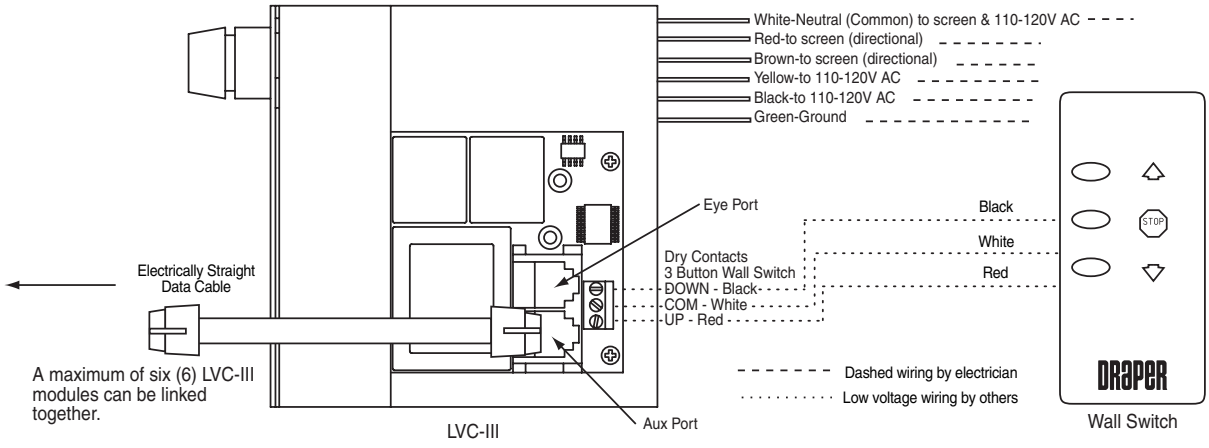
Wiring Diagram for LVC-III with Multiple Low Voltage Input Devices



① *Wire Screen according to diagram.*
② *Press "Up." If screen goes down, up and down wires from motor should be switched (LED Wall Switch or IR or RF remote control). Motor directions will now be reversed. (For Dry Contact Wall Switch, switch out red and black wires.) Please Note: RF receiver must "learn" the transmitter. Receivers can "learn" up to five remote transmitters. See instructions on page 7.*

Wire to connect power to LVC-III should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The LVC-III comes enclosed in a metal box conforming to the National Electric Code (NEC). If using RF receiver, IR Eye LED wall switch, connect to LVC-III using low voltage modular data or telephone cord (RJ11), which is isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). LED Wall Switch or RF receiver must be within 1,000 feet of LVC-III; IR eye must be within 100 feet of LVC-III. If using more than one device that requires modular cable, use a splitter. A dry contact wall switch may be connected to the LVC-III using 3 conductor wire with ground. RS232 connection to AV Integration systems is also through dry contacts. Use splitters to add control input devices.

Wiring Diagram for Multiple LVC-IIIs with One or More Low Voltage Input Devices



① *Wire Screen according to diagram.*
② *Press "Up." If screen goes down, up and down wires from motor should be switched. Motor directions will now be reversed.*

Please Note: In above configuration, the dry contact switch controls only one LVC-III; dry contact switches must be wired to each LVC-III.

Wire to connect power to LVC-III should be between 18 AWG and 12 AWG (solid or stranded) 2 conductors with ground. Wire size needs to be sufficient to carry the motor load. Red and Black wires are the "open" and "close" leads from the motor. The LVC-III comes enclosed in a metal box conforming to the National Electric Code (NEC). If using RF receiver, IR Eye LED wall switch, connect to LVC-III using low voltage modular data or telephone cord (RJ11), which is isolated from the AC power line. This wire is commonly called Silver Satin. It must be electrically straight (see explanation on page 2). If using more than one device that requires modular cable, use a splitter. A dry contact wall switch may be connected to the LVC-III using 3 conductor wire with ground. RS232 connection to AV Integration systems is also through dry contacts. Use splitters to add control input devices. Use electrically straight modular cable to connect additional LVC-III modules. Connect LVC-IIIs by going FROM "Aux" port TO "Eye" port. Up to six LVC-III modules may be linked in this way.